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COWLES FOUNDATION DISCUSSION PAPER NO. 1061

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THE NATURAL RATE AS NEW CLASSICAL MACROECONOMICS

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October 1993

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August 23, 1993

For Rod Cross, The Natural Rate Hypothesis Twenty-Five Years On

### ABSTRACT

Friedman identified his "natural rate" as Walrasian equilibrium. Keynes's "full employment" is also classical equilibrium: labor markets are clearing at existing real wages. Why is equilibrium unemployment not zero? Keynes and Friedman cite, but do not explain, "frictional" unemployment. They differ on what explains cycles. Friedman and Lucas answer: misperceptions of inflation. Markets clear at wrong prices and quantities. Today New Classicals stress variations in the natural rate itself. In Keynesian cycles markets don't clear. Excess supplies or demands trigger Phillips-curve movements of wages and prices. Unemployment and vacancies coexist in varying proportions because inter-sectoral shocks always occur. Adjustment dynamics, not representative-agent equilibria, determine the economy's behavior at NAIRU and other unemployment rates. Money makes a difference, not because of money illusions or misperceptions but because adjustments begin with nominal wage and price responses.

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### Friedman, Lucas, and Market-Clearing

In retrospect, Friedman's 1967 Presidential Address to the American Economic Association (Friedman 1968) was the opening gun of the New Classical Macroeconomics. the precursor of Lucas's "misperceptions" explanation of Phillips curve observations and of the "policy ineffectiveness proposition." Like Lucas (1973) and other New Classicals, Friedman deploys ancient classical money-is-a-veil doctrine to argue that only real prices and real wages can determine real quantities of production and employment. Apparent relations between money prices and real quantities, like the Phillips curve, are bound to be ephemeral, especially if policy-makers try to exploit them. The Friedman-Lucas doctrine is that the economy behaves as if markets were determining real prices all the time. Those prices are the arguments in supply and demand functions, and equalities of demand and supply shape the path of the economy.

The natural rate, according to Friedman, is "the level that would be ground out by the Walrasian system of general equilibrium equations..." The sentence continues with the proviso that "imbedded" in these equations are phenomena that no one know how to imbed in them, "market imperfections, stochastic variability in demands and supplies, the cost of gathering information about job vacancies and labor availabilities, the cost of mobility, and so on." After this gesture Friedman forgets about these awkward non-Walrasian phenomenon and applies classical doctrine unconditionally.

How do deviations from the natural rate occur? There are two possible answers, not necessarily exclusive, New Classical and Keynesian. In New Classical theory, departures from the natural rate result from distortions of demand and supply schedules because of misperception, misinformation, or incorrect expectations regarding the real wages and prices relevant to those schedules. Markets still clear, supply still equals demand, just as in natural rate equilibrium, but the prices, wages, and quantities determined in those markets differ from natural rate outcomes. Friedman describes graphically the dynamics of the expectational adjustments that lead to accelerations of prices up or down when employment and output are higher or lower than their natural rate values. Lucas introduces here the powerful tools of rational expectations, but that does not make his story essentially different from Friedman's. Both of them say that unanticipated monetary policy and inflation can raise employment temporarily, but only temporarily and only by fooling workers and employers.

#### Keynes and Uncleared Markets

Keynesian "full employment" is the counterpart of the natural rate. It too is a real classical equilibrium, in which equality of the marginal productivity of labor and the marginal disutility of work determines real wages and the volumes of employment and output. But the Keynesian explanation of departures from full employment is quite different from the Friedman-Lucas description. It is that markets are not clearing. Lapses from full employment occur when there is excess supply of labor, involuntary unemployment. Some workers are unemployed even though they are willing to work at prevailing real wages, or less, and are no less efficient and productive than employed

workers. This involuntary unemployment arises not because of the usual classical culprits, interferences with competition by trade unions and government regulations, but because market prices adjust slowly, certainly not instantaneously, to aggregate demand shocks. (Keynes 1936, Book I)

The idea that adjustments to shifts of supply and demand curves are not immediate would not have troubled the classical economists of Keynes's generation. It is only their latter-day successors, Friedman<sup>1</sup>, Lucas, and other New Classicals who assume that observed prices and quantities are continuously the outcomes of price-cleared markets. "Real business cycle" theorists represent the ultimate in this intellectual tradition; they do not even recognize the distortions of supply and demand schedules that explain departures from the natural rate in Friedman and Lucas. For them, the natural rate is just the actual rate, whatever it is today.

#### Frictional and Involuntary Unemployment

A simplistic aggregative interpretation of either Keynes's full employment or Friedman's natural rate would imply that in those equilibria unemployment would be zero -- involuntary unemployment, that is. Voluntary choice to be out of the labor force is not at issue. The United States Census Current Population Survey measure of unemployment is a close empirical approximation to the relevant concept of involuntary unemployment; it counts as unemployed persons who were not employed any time during the survey week but report that they have been looking for work during the past four weeks.

Keynes is almost as cavalier as Friedman on this point. He allows "frictional" unemployment to coexist with full employment, and he gives several reasons that "there will always exist in a non-static society a

proportion of resources unemployed 'between jobs.'" (Keynes, 1936, p.6)

However, a better theory of the relation of unemployment and inflation would provide a more complete account of frictional unemployment, and of Friedman's various addenda to Walrasian equations.

A more crucial question for each of the two theories is whether it ever implies involuntary unemployment. The Keynesian model obviously does. In natural rate theory, however, labor markets are always clearing. Although workers may misperceive and underestimate the real wages they face, they are getting as much employment as they desire in present circumstances as they understand them. The Census would not count them as unemployed. Of course, New Classical macroeconomists have never regarded involuntary unemployment as reported in surveys as meaning anything they need to explain. Critics may regard that omission as a serious defect.

#### Keynes's Monetary Economy

Both Keynes's full employment and Friedman's natural rate relate nominal wage or nominal price change to discrepancies from those equilibria. In Friedman and Lucas, these movements are the market-clearing results of adjustments of demand and supply to revised estimates of current and future real wages and prices. In Keynes, they are the natural competitive responses to excess supply or excess demand. While classicals, new or old, viewed markets as generating real prices and wages, Keynes stressed that we live in a monetary economy, in which the wages and prices determined in markets, both in equilibrium and during disequilibrium adjustments, are wages and prices expressed in the monetary unit of account. Because these adjustments take real time, real wages and prices will deviate from their equilibrium values for

finite periods of time, perhaps even for extended periods of time. But this does not reflect money illusion in agents' behavior, nor irrational expectations, nor imperfect or asymmetrical information.

The Phillips curve is the natural extension to economy-wide labor markets of the conventional dynamics of supply and demand both in Marshallian sectoral markets and in Walrasian general equilibrium. Until the last twenty or thirty years economists of all persuasions recognized that supply and demand do not clear continuously, that it takes real time for prices and quantities to adjust to shifts in the curves. The common scenario, long used by teachers and texts of introductory economics, was and is that prices move down when there is excess supply, roughly proportionately to the amount, and likewise move up in response to excess demand. This informal but intuitive dynamics convinces students that supply/demand analysis makes sense. For a single market, small relative to the whole economy, it is reasonable to interpret these movements as adjustments in both real and nominal prices at the same time.

Keynes's important insight was that this story does not carry over to economy-wide adjustments of money wages to excess demands or supplies. Clearly the economy-wide nominal prices of commodities, which translate money wages into real wages, are not independent of nominal labor costs. The dynamics are much more complex and chancy than uncritical analogy to the textbook story for single small markets suggests. Indeed, as Keynes pointed out, downward adjustments of money wages may not reduce the real wage at all, and may not eliminate or reduce the unemployment that triggered them. Yet New Classicals ignore Keynes's Chapter 2. They finesse all the anomalies raised by the fact that their models make behavior depend only on real prices while actual

markets generate nominal prices.<sup>2</sup>

In labor markets unemployment and vacancies are consequences and indicators of failures of markets to clear at prevailing prices. To describe the failure another way, prices are not flexible enough, instantaneously flexible enough, to equate demand and supply at every moment of time. As older generations of economists took for granted, excess supplies and demands -- unemployment and vacancies respectively in particular labor markets -- commonly occur and trigger movements of prices and quantities -- specifically money wages and employment.

Keynes argued, of course, that nominal wages are sticky. His argument exploited the truth that money wages are determined in a host of disaggregated markets, not in a single economy-wide market or national negotiation. In every particular market workers and employers might well believe that a money wage cut would be a cut in their wages relative to those of workers elsewhere, and resist it on those grounds. Although Keynes purported to be adopting the classical assumption that both product and labor markets are purely competitive in the absence of monopolistic combinations or government regulations, his discussion of the realities of labor markets seems to recognize monopolistic competition and bilateral bargaining as normal features of wage determination.

#### The Phillips Curve

Phillips (1958) was well within Marshallian and Keynesian traditions when he plotted nominal, not real, wage changes against unemployment rates. Friedman missed the point when he called this choice a "basic defect." This is not to deny that changes in money wages in labor markets will reflect expected



nominal wage and price movements throughout the economy, as well as pressures from excess supply, unemployment, and excess demand, job vacancies. If the real economy and monetary quantities are growing at different rates, equilibrium nominal prices will be moving, too. In a full and continuing equilibrium, expectations will be confirmed by future events. If equilibrium prices are moving, consumers, workers, and business managers will anticipate those trends.<sup>3</sup>

The Phillips Curve came to prominence on the American macroeconomic scene in the 1950s, when money wages and prices appeared to accelerate while employment was less than what was regarded as "full." A new category of inflation had been discovered and a new term invented, "cost push" as distinguished from "demand pull." But a name is not an explanation, and there was no theory of the sources of cost-push. A different approach, consistent with Phillips Curve observations, was to regard "full employment" as a zone rather than a point, and inflation not as an either-or discontinuity but as a matter of degree, depending on the prevalence of excess demand markets in the economy.

Essential to this rationale is recognition of three characteristics of the sources of Phillips curve observations. Two of them I have already discussed: that, as Keynes stressed, the wages and prices determined in markets are expressed in the monetary unit of account, and that disequilibrium in a market -- excess supply or demand at prevailing prices -- is a crucial source of changes in wages or prices. The third is the multiplicity of labor and product markets and the diversity of the demand/supply circumstances of the several markets.

## The Beveridge Curve

We know from common observation that excess supplies and excess demands exist simultaneously in the economy. Specifically, in some labor markets unemployed workers outnumber job vacancies, while in others at the same time vacancies exceed unemployment. One might, as suggested in (Tobin, 1972), define a single labor market narrowly enough so that both vacancies and unemployment do not coexist within it.

At any moment there are both vacancies markets, those with excess demand, and unemployment markets, those with excess supply. Of course, the identities of markets within the two classes are always changing, as supply/demand balances shift. Yet over the economy as a whole there is considerable stability in the relation between aggregate vacancy and unemployment rates, as they vary in business fluctuations. This is a negative relationship: high vacancies go with low unemployment, and vice versa. Moreover, the marginal decrease in vacancies per unit increase in unemployment declines with the unemployment rate. This relation is often called the Beveridge curve. Sir William H. Beveridge (1945) defined employment as full if unemployment is no more numerous than vacancies. In this context it is easy to define frictional unemployment, namely the maximum amount of unemployment consistent with Beveridge's criterion of full employment.

In practice it is difficult to implement this conceptual framework literally, because vacancies and idle workers cannot be measured so that one vacancy is really comparable to one unemployed worker. But the framework is useful. For example, consider the frequently recurring controversy whether observed increases in unemployment are frictional or structural, on the one hand, or cyclical and "Keynesian", on the other. In the former case, there

would be in effect an increase in the natural rate or, to use a more appropriately neutral term, the Non-Accelerating-Inflation Rate of Unemployment (NAIRU), and demand stimulus would not be the appropriate remedy. In the latter case, there would be an increased shortfall from full employment, and Keynesian demand policy would be called for. In the former case, the Beveridge curve would have shifted outward, in a way that increased both vacancies and unemployment. In the latter case, there would have been movement along an unchanged Beveridge curve, not an outward shift.

#### "Stochastic Macroequilibrium" and the NAIRU

In my own Presidential Address in 1971 (Tobin, 1972), I described a Phillips curve theory based on what I called stochastic macroequilibrium: "stochastic because random intersectoral shocks keep individual labor markets in diverse states of disequilibrium; macroequilibrium, because the perpetual flux of particular markets produces fairly definite aggregate outcomes of unemployment and wages." In this model I was following contributions by Lipsey (1960), and by Archibald and Holt in (Phelps, 1970). Here it is again.

The microeconomics of the Phillips curve is that money wages rise in excess demand labor markets and fall in excess supply markets, in rough proportions to the amounts of excess demand or supply. These are movements relative to market-clearing wages, which may themselves be moving. Economy-wide average wage change depends on both vacancies and unemployment. The macro Phillips and Beveridge Curves arise as joint outcomes of the events in individual markets and of the distribution of excess demands and supplies among them. As the aggregate number of jobs increases relative to the labor force, more markets will experience vacancies and fewer will exhibit excess

supplies of workers. The rate of wage inflation will be greater, and as the norms of wage settlements rise in response, Friedman's unbounded acceleration may occur.

Individual markets are subject to stochastic shocks in supply and demand. If these shocks were to cease, adjustments of prices and of quantities -- e.g. movements of workers towards markets with higher wages and greater excess demands -- could bring equilibrium with markets cleared. The only aggregate quantity of jobs compatible with such an equilibrium is a quantity equal to the labor force. This equilibrium would carry with it a "natural rate" of unemployment, namely zero, at stable wages and prices.

Suppose, however, the macroeconomic environment is stable, as measured by the aggregate number of jobs, while the distribution of these jobs among individual markets is constantly changing. Even if the distribution of excess demand and supply across markets remains constant, the positions of individual markets in the distribution are in continuous flux.

What is happening to money wages depends on the dynamics of adjustment to excess demands and supplies. Since these adjustments take time, there are bound to be some vacancies and some unemployment. The balance between them will vary with the macro environment, the aggregate of jobs. Beveridge full employment will not necessarily result in average wage change of zero (relative to the equilibrium trend). The NAIRU can well involve unemployment in excess of vacancies, jobs fewer in aggregate than the labor force. This would happen if downward adjustments of wages in excess supply markets are slower than upward adjustments in excess demand markets. Nonlinearity of response of this kind introduces an inflationary bias to the system. The same nonlinearity of response would imply that the NAIRU is higher the greater the

dispersion of excess demands and supplies across markets.

The model also allows for mobility of workers towards markets with higher wages and more vacancies. Within limits, the greater is such endogenous mobility the fewer will be the mismatches reflected in frictional unemployment and the lower will be the NAIRU.

My 1971 model assumed -- with one exception -- that, for any given aggregate quantity of jobs relative to labor force, increases in average money wages over time would ultimately feed fully into wage determination in every sector. This is a recipe for a vertical long-run Phillips curve a la Friedman. But I did point out a possible exception, a way in which a long-run tradeoff might be preserved. Suppose that in any market money wages will not actually decline unless and until a high rate of unemployment has persisted for several periods. This barrier might temporarily prevent the wage increase in the sector from falling as far below the general norm as would be appropriate to prevailing excess supply in the sector. If the wage increase norm were high, that rate of unemployment would without delay generate a wage increase appropriately below the norm but still non-negative. But if the wage increase norm were so low that it would take a money wage decline to bring about that same differential, the decline would be postponed and for a while there would be no change. Eventually, however, this barrier would give way.

This phenomenon is realistic, whether or not it is irrational. Even if it could be said to show money illusion, it is not a permanent non-homogeneity in any market. However, the positions of markets are always shifting. So there may always be some markets at the nominal barrier, their identities always changing. If so, increasing the aggregate number of jobs will at the same time reduce the unemployment rate and increase the average rate of wage inflation.

The effects of actual wage change on the wage norm are diluted by the fact that money wages remain unchanged in those sectors at the money wage floor. There is a permanent tradeoff in aggregate, though not in any one market. But the long-run Phillips curve will still become vertical when the average wage increase and the general wage increase norm are high enough so that no adjustments in any market would require nominal wage cuts. I am afraid that critics did not understand this subtle and ingenious argument; they just thought I was committing a vulgar error.

#### In Conclusion

The symmetry between accelerating inflation and accelerating deflation in Friedman's model has always been hard to believe. Unemployment lower than the natural rate spells exploding inflation, he says, and unemployment higher spells galloping disinflation and deflation. In contrast, in Keynes open-end inflation results from an "inflationary gap" in aggregate demand, while a "deflationary gap" leads to comparative stability of prices or price trends. The asymmetry stems from Keynes's observation of the downward stickiness of money wages.

I am inclined to believe in an S-shaped short-run Phillips curve for both individual markets and the economy at large, still embodying some Keynesian asymmetry. At low unemployment rates and high vacancy rates, the curve would become quite steep. At high unemployment rates and low vacancy rates, as for example in 1982 in the United States, the marginal response of wage inflation to additional unemployment would be increasing. For intermediate unemployment and vacancy rates the curve would be fairly flat, making it hard to locate any precise NAIRU. In this central flat range,

transient microeconomic ups and downs in prices and wages would be more important than macro events and policies. After all, it is difficult to believe in a knife-edge natural rate or full employment, implying that small changes in the tightness of labor markets have immense qualitative and quantitative consequences. Natura non facit saltum, so it says on Marshall's title page.

NAIRU is not a Walrasian solution. It has no particular claim to be called natural or optimal. Its dynamic and distributional determinants come from institutional features of markets and from stochastic inter-market flux rather than from rational utility-maximizing determinants of real supply and demand relations. We economists do not, not yet anyway, have a general theory of optimization applicable to dynamic adjustment mechanisms, because neither the objectives of such behavior nor the constraints upon it can be, except in simple specific cases, formulated in terms of the utility and production functions which make us feel comfortable and on which we base ordinary supply and demand functions. Our models should of course be consistent with rational behavior, including the absence of money illusion, in equilibrium. But in a monetary economy, in which markets, imperfect or perfect, grind out money wages and prices along with real quantities, we have no right to rule out a priori money effects on real variables during disequilibrium adjustments. This was Keynes's message, and both friends and foes in the profession were quite obtuse and wrong in attributing to him gratuitous assumptions of irrational money illusion.

In the end, the most destructive feature of natural rate theory is not its sensible warning against overdoing policies to expand aggregate demand in order to reduce unemployment below an inflation-safe rate. It is its

inhibition against expansionary demand policies in any circumstances. This comes from New Classical Macroeconomics and Real Business Cycle Theory, and they are next-of-kin heirs of Milton Friedman's 1967 Presidential Address, very likely the most influential article ever published in an economics journal. Its influence reached way beyond the profession -- for example, to European and Japanese governments and central banks and to The Economist and other opinion leaders. Europe has never really recovered from the recessions of 1974-75 and 1979-82, and now the entire advanced democratic capitalist world is stagnating.



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## ENDNOTES

1. Until I re-read Friedman's Presidential Address in order to write this article. I had the impression that Friedman accepted a Keynesian non-market-clearing explanation of unemployment in excess of the natural rate. Now, however, I think the wage and price adjustments in the article are better interpreted as corrections of expectations than as responses to excess demand or supply. The spirit of Lucas is also evident in Friedman's stress that the monetary authority "cannot use its control over nominal quantities to peg a real quantity." The word "peg" does leave some ambiguity, about the length of time for which a particular value of a target variable is the policy objective. But the spirit of the article, reinforced by the critical dismissal of "fine-tuning," suggests that the monetary authority should eschew any real target at any time.

The Presidential Address is not the only evidence of Friedman's drift towards a New Classical or "real business cycle" position. In his ultimate defense of his position that fiscal policy has no macroeconomic consequence he embraced the classical view that price flexibility keeps the economy at full employment (natural rate) anyway. [Quote and reference to Journal of Law and Economics article will be provided in October after I return to Yale]

2. Dudley Dillard (1988) called this contradiction the "Barter Illusion in Classical and Neoclassical Economics." I have discussed these issues at length in (Tobin, 1993).

3. That norms for wage increases would reflect actual experience and expectation of economy-wide wage and price inflation was widely appreciated before 1967 by economists who found the Phillips curve a useful macroeconomic tool. The famous or infamous Samuelson-Solow article (1960) recognizes this explicitly.

Consider also the following part of a paper presented in October 1966: "[We do not] know the answer to the ... basic question whether continuation of 4 percent unemployment would, so long as it generates any inflation, generate an accelerating inflation. This would be the orthodox prediction: Wages and other incomes rise because people want real gains, and the bargaining power of individuals and groups depends on the real situation. If they find that they are cheated by price increases they will simply escalate their money claims accordingly. On this view the Phillips curve would blow up if growth at a steady utilization rate were maintained... On this interpretation, the only true equilibrium full employment is the degree of unemployment that corresponds to zero inflation -- any higher rate of utilization can be called excess demand. This is a dismal conclusion if true, because it appears to take a socially explosive rate of unemployment -- more than 6 percent in the U.S.A. -- to keep the price level stable." (Tobin, 1967) I would add that when President Kennedy's Council of Economic Advisers in 1961 set 4 percent unemployment as the goal of macro policy, we were not proposing to take a ride up a Phillips curve to purchase lower unemployment than the 7 percent then prevailing at the expense of more inflation. We believed, maybe wrongly but not obviously so then or now, that 4 percent was at that time consistent with stable low inflation. We proposed also to take out insurance by incomes policy, "wage-price guideposts." Inflation accelerated in the late 1960s when Vietnam war fiscal and monetary policy carried unemployment down to 3 percent.